

the cell, which bladder is armed with three spines set in one whorl. In *Millepora* the spines are unusually long and set at right angles to the thread. This kind of thread-cell alone occurs in the tentacles; it occurs also more sparingly in the hydrophyton.

The other kind of thread-cell is larger and ovoidal in form, closely resembling that figured by Allman as occurring in *Gemmaria implexa*. These thread-cells are confined to the hydrophyton. They form densely set zones around the bases of the zooids.

The other species of *Millepora* examined appear to agree in all essential particulars with that occurring at Tahiti. They have mouthed and mouthless zooids, but these are not arranged in regular systems. They have the same two kinds of thread-cells, with a similar distribution. The Tahitian *Millepora*, like the others examined, is infested by a parasitic fungus, which exists in the soft superficial tissues, as well as in the substance of the corallum, and has a decided green tint.

GEOLOGICAL SOCIETY.

March 22, 1876.—Professor P. Martin Duncan, M.B., F.R.S.,
President, in the Chair.

“On the Triassic Strata which are exposed in the Cliff Sections near Sidmouth, and a note on the occurrence of an Ossiferous Zone containing Bones of a *Labyrinthodon*.” By H. J. Johnston Lavis, Esq., F.G.S.

The author described the base of the cliffs east of Sidmouth as composed of the Marl which is the uppermost subdivision of the Trias in South Devon, capped in Littlecomb Hill and Dunscob Hill by Greensand and Chalk, and in Salcombe Hill by Greensand alone. In the valley of the Sid it is largely exposed at the surface. Close to the mouth of the Sid the Upper Sandstone crops out beneath the marl, forming a cliff overhanging the river. To the west of Sidmouth there is a low projecting cliff, the Chit rock, formed also of the Upper Sandstone; and at the western end of this is a fault which has given the Chit rock an upthrow of at least 40 and perhaps of 80 feet, since it has no marl capping it, and in its lithological character it resembles the middle part of the Upper Sandstone. To this point the dip is to the east; but westward of the fault the dip is at first to the west for about half a mile, when the sandstone reappears with an easterly dip, having formed a synclinal curve. It is overlain by Marl and Greensand in Peake and High-Peake Hills, which are capped with Chalk gravels. West of High-Peake Hill the Sandstone forms the whole cliff. The author described the general characters presented by the Triassic beds in the section under notice, and mentioned the occurrence at about 10 feet from the top of the Sandstone of a peculiar series of beds, composed of coarse sandstone, containing scattered nodules of marl from the size of a pea to that of a hen's egg, together with numerous

fragments of bone, some of which, belonging to a species of *Labyrinthodon*, would be described by Prof. Seeley. The author mentioned that he had received from the Rev. S. H. Cooke some fragments of bone obtained by him twenty years ago from this same "ossiferous zone." Mr. Whitaker's specimen of *Hyperodapedon* was also obtained from the Upper Sandstone.

"On the Posterior Portion of a Lower Jaw of *Labyrinthodon* (*L. Lavis*) from the Trias of Sidmouth." By Harry Govier Seeley, Esq., F.L.S., F.G.S., Professor of Physical Geography in Bedford College, London.

After referring to the doubtful position of the Labyrinthodontia in the system, and expressing his doubts as to the occurrence of the genus *Mastodonsaurus* in Britain, the author proceeded to describe in detail the posterior part of the right ramus of the lower jaw of a Labyrinthodont, obtained by Mr. Lavis from the ossiferous zone of the Trias near Sidmouth, the position of which was described by that gentleman in the preceding paper. The specimen, which is 13 inches long, and perfectly free from matrix, shows that the lower jaw in Labyrinthodonts not only contains articular, angular, and dentary elements, as hitherto supposed, but also separate splenial and surangular elements, and probably a distinct coronoid bone. These bones were described in detail; and the author remarked that although they are somewhat reptilian in aspect and arrangement, they are not very suggestive as to the affinities of *Labyrinthodon*. They surround a central hollow space, which no doubt received the primitive cartilage round which the bones were ossified; and the persistence of this character would seem to be a link rather with the lower than with the higher Vertebrata. The jaw differs from the Batrachian mandible in possessing well developed angular and surangular elements; and some reptiles, such as Crocodiles and the marine Chelonia, present analogies in the perforations, the structure of the jaw, and the sculpture of the bones. In size the specimen is almost identical with that figured by Mr. Miall as belonging to *Labyrinthodon pachygnathus*; but the depth and outlines of the postarticular part of the jaw, and differences in the sculpture of the lateral subarticular ornament, furnish distinctive characters which lead the author to describe the present specimen as representing a new species, which he names, in honour of its discoverer, *Labyrinthodon Lavis*. The author briefly noticed several other bones and fragments obtained by Mr. Lavis in the same locality, some of which probably belonged to the same skeleton.

"On the Discovery of *Melonites* in Britain." By Walter Keeping, Esq.

The author described a specimen from the Carboniferous limestone of Derbyshire in the museum of the Geological Survey, which displays numerous plates belonging to the test of a large Echinoid,

considered by him to be a new species of the genus *Melonites*, hitherto regarded as peculiar to America. The author proposed to call this species *Melonites Etheridgei*; and he described it as possessing a more or less spheroidal test, about 7 inches in diameter, composed of very thick plates, arranged in five ambulacral and five interambulacral areas, all the plates being ornamented with minute tubercles for the support of spines. The interambulacral areas were probably about twice as broad as the ambulacral, and composed (at the equator) of about nine ranges of plates, the marginal ones pentagonal, the rest hexagonal, articulating with each other by faces varying from a right angle to one of 30° . The ambulacral areas were broad, each formed of two convex ribs separated by a meridional depression running from mouth to anus, and each rib (half-area) composed of 6 or 7 ranges of irregular plates, each perforated by a pair of simple pores. The tubercles are minute, imperforate, without boss, and of two orders, the larger surrounded by a smooth areola, bounded by an elevated ring. The spines are small, tapering, coarsely sulcate, with a prominent collar round the articular end. A second specimen exists in the British Museum. The species differs strikingly from the North-American *Melonites multiporus* in the characters of the ambulacral areas, which have 12–14 ranges of plates and are divided by a meridional furrow in the new species, and only 8 ranges of plates, with a median ridge formed of plates twice as large as the rest, in *M. multiporus*.

April 5th, 1876.—Prof. P. Martin Duncan, M.B., F.R.S., President, in the Chair.

“The Bone-Caves of Creswell Crags.” By the Rev. J. Magens Mello, M.A., F.G.S.

In this paper the author gives an account of the continuation of his researches upon the contents of the caves in Creswell Crags, Derbyshire. The further exploration of the Pin-hole cave described in his former paper*, furnished a few bones of Reindeer, *Rhinoceros tichorhinus*, and other animals, but no more remains of the Arctic Fox, which were particularly sought for. Operations in this cave were stopped because the red sand, in which the bones were found towards the entrance, became filled with limestone fragments, and almost barren of organic remains. The author then commenced the examination of a chambered cave called Robin Hood's cave, situated a little lower down the ravine on the same side. The section of the contents of this cave showed:—a small thickness of dark surface-soil, containing fragments of Roman and Mediæval pottery, a human incisor, and bones of sheep and other recent animals; over a considerable portion a hard limestone breccia, varying in thickness from a few inches to about 3 feet; beneath this a deposit of light-coloured cave-earth, varying in thickness inversely to the breccia, overlying a dark-red

* See Quart. Journ. Geol. Soc. vol. xxxi. p. 679.

sand about 3 feet thick, like that of the Pin-hole, but with patches of laminated red clay near the base, and containing scattered nodules of black oxide of manganese, and some quartzite and other pebbles, which rested upon a bed of lighter-coloured sands containing blocks of limestone, probably forming part of the original floor of the cavern. The hard stalagmitic breccia contained a great many bones (chiefly of small animals, but with some of Reindeer), and teeth of *Rhinoceros tichorhinus*, Hyæna, Horse, Water-vole, and numerous flint flakes and chips, and a few cores. Some of the flakes were of superior workmanship. A few quartzite implements were also found in the breccia. The cave-earth contained a few flint implements; but most of the human relics found in it were of quartzite, and of decidedly palæolithic aspect. There was also an implement of clay-ironstone. The animal remains chiefly found in the cave-earth were teeth of Horse, *Rhinoceros tichorhinus*, and Hyæna, and fragments of both jaws of the last-mentioned animal. Bones and teeth of Reindeer, and teeth of Cave-Lion and Bear also occurred. The red sand underlying the cave-earth contained but few bones, except in one place, where antlers and bones of Reindeer and bones of Bison and Hyæna occurred. At another part a small molar of *Elephas primigenius* was found. A large proportion of the bones had been gnawed by Hyænas, to whose agency the author ascribed the presence of most of the animal remains found; but he remarked that no coprolites of Hyænas had been met with. The following is a list of the animals whose remains occurred in this cavern:—*Felis leo* (var. *spelæa*), *Hyæna crocuta* (var. *spelæa*), *Ursus arctos*, *U. ferox*, *Canis familiaris*, *C. lupus*, *C. vulpes*, *Elephas primigenius*, *Equus caballus*, *Rhinoceros tichorhinus*, *Bos bison*, var. *priscus*, *Bos longifrons*, *Capra hircus*, *Sus scrofa domesticus* and *ferus*, *Cervus megaceros*, *C. tarandus*, *Arvicola amphibius*, and *Lepus timidus*.

“On the Mammalia and Traces of Man found in the Robin-Hood Cave.” By W. Boyd Dawkins, Esq., M.A., F.R.S., F.G.S., F.S.A., Professor of Geology and Palæontology in the Owens College, Manchester.

The author noticed the various species of animals discovered by Mr. Mello during the researches, the results of which are given in the preceding paper, and drew certain conclusions from their mode of occurrence as to the history of Robin Hood's Cave. He considered that the cave was occupied by Hyænas during the formation of the lowest and middle deposits, and that the great majority of the other animals whose remains occur in the cave were dragged into it by the Hyænas. That they served as food for the latter is shown by the condition of many of the bones. During this period the red sand and clay of the lowest stratum was deposited by occasional floods. The red loam or cave-earth forming the middle stratum was probably introduced during heavy rains. The occupation of the cave by Hyænas still continued, but it was disturbed by the visits of Palæolithic hunters. The remains found in the

breccia indicate that the cave was inhabited by man, and less frequently visited by Hyænas than before. The presence of vertebræ of the Hare in the breccia would imply that the hunters who occupied the cave had not the dog as a domestic animal. After a discussion of the relations of the animals forming the fauna of the cave, the author proceeded to describe the traces of man found in it, which consist of fragments of charcoal, and implements made of antler and mammoth-tooth, quartzite, ironstone, greenstone, and flint. The distribution of these implements in the cave represents three distinct stages. In the cave-earth the existence of man is indicated by the quartzite implements, which are far ruder than those generally formed of the more easily fashioned flint. Out of 94 worked quartzite pebbles only 3 occurred in the breccia, while of 267 worked flints only 8 were met with in the cave-earth. The ruder implements were thus evidently the older, corresponding in general form with those assigned by De Mortillet to "the age of Moustier and St. Acheul," represented in England by the ruder implements of the lower breccia in Kent's Hole. The newer or flint series includes some highly finished implements, such as are referred by De Mortillet to "the age of Solutré," and are found in England in the cave-earth of Kent's Hole and Wookey Hole. The discovery of these implements considerably extends the range of the Palæolithic hunters to the north and west, and at the same time establishes a direct relation in point of time between the ruder types of implements below and the more highly finished ones above.

May 10, 1876.—Prof. P. Martin Duncan, M.B., F.R.S., President, in the Chair.

"On some Fossil Reef-building Corals from the Tertiary Deposits of Tasmania." By Prof. P. Martin Duncan, M.B., F.R.S., President.

The species described by the author were *Heliastrea tasmaniensis*, sp. n., *Thamnastræa sera*, sp. n., and a second species of *Thamnastræa*. Both these genera are composed of reef-building Corals; and the species here described undoubtedly belonged to that category. They required the natural conditions peculiar to coral reefs. The author noticed the facts as to the distribution of land and water in the Australian region in Lower Cainozoic times, which are revealed by the deposits belonging to that age, and indicated that, although the insular distribution of the land may have been favourable to the growth of coral reefs, the existence of a suitable sea-temperature in the latitude of Tasmania is insufficiently explained. A single relic of the old reef-building Corals survives on the shores of Tasmania in the *Echinopora rosularia*, Lam.; but all the other forms have died off. The Coral-isotherm would have to be 15° lat. south of its present position to enable reefs to flourish south of Cape Howe; and this could be caused only by a change in the arrangement of land and sea, and in the position of the polar axis. The author

indicated the general arrangement of land which seemed to have prevailed, and noticed that at that period and even earlier the Coral-isotherm of 74° reached fully 25° north of its present position in the portion of the globe antipodean to Tasmania; but it would seem to require more than mere geographical changes to account for the existence of important reefs in Western, Central, and Southern Europe and in Tasmania synchronously. The flora underlying the marine Cainozoic deposits of Victoria indicates tropical conditions, as do the Echinodermata of the succeeding strata (described in the following paper). The fossil plants of the Arctic regions, from the Carboniferous to the Miocene epoch, give evidence of the existence of higher temperatures and of other conditions of light than those now prevailing; but were the polar axis at right angles to the plane of the ecliptic, and were there no greater node than at present, there would be equal day and night at all points. The difficulty is to account for the present position of the axis on this supposition; but the author suggested that the great subsidences of Miocene lands, the formation of the southern ocean, and the vast upheavals of northern areas at the close of the Miocene epoch may have sufficed to produce the present condition of things.

“On the Echinodermata of the Australian Cainozoic (Tertiary) Deposits.” By Prof. P. Martin Dunean, M.B., F.R.S., President.

In this paper, after noticing the history of our knowledge of Australian Tertiary Echinida, the author gave a list of the species at present known, amounting in all to 23, and described the following as new species—*Leiocidaris australiæ*, *Temnechinus lineatus*, *Arachnoides Loveni*, *A. elongatus*, *Rhynchopygus dysasteroides*, *Echinobrissus australiæ*, *Holaster australiæ*, *Maretia anomala*, *Eupatagus rotundus*, and *E. Laubei*. The author remarked upon the characters and synonymy of the previously known species, his most important statement being that the so-called genus *Hemipatagus* is in reality identical with the recent genus *Lovenia*, Gray, as clearly shown by fine specimens in his possession. The most marked genera of the existing Australian fauna are not represented, but are replaced by numerous Spatangoids; three species, however, are identical; but two of these have a very wide range. Of the remainder, 9 are allied to recent Australian species, mostly from the north of the continent; 6 are allied to European and Asiatic Cretaceous forms; 5 are closely related to Nummulitic types; and one species appears to belong to a peculiar genus, namely, *Paradoxechinus novus*, Laube.

“On the Miocene Fossils of Haiti.” By R. J. Lechmere Guppy, Esq., F.L.S., F.G.S.

After referring to the literature of the subject, the author stated that his paper was founded to a great extent upon the examination of specimens in the Society's Museum. He gave a list of the described fossil shells of St Domingo, with notes on their synonymy,

and described as new the following species—*Sigaretus excentricus*, *Cancellaria epistomifera*, *Murex cornurectus*, *Turbinellus ædificatus*, *Cyprea Gabbiana*, and *Phorus delertus*.

May 24, 1876.—Prof. P. Martin Duncan, M.B., F.R.S., President, in the Chair.

“Evidences of Theriodonts in Permian Deposits elsewhere than in South Africa.” By Prof. R. Owen, C.B., F.R.S., F.G.S.

In this paper the author noticed some described Reptilia which he believes to belong to his order Theriodontia. In 1838 Kutorga described as probably mammalian the distal end of a humerus showing a perforation or canal above the inner condyle. The specimen was from the Permian of the Western Ural; and Kutorga gave it the name of *Brithopus priscus*. Under the name of *Orthopus primævus* he described the proximal part of the humerus of the same species, perhaps of the same bone. There is thus evidence of an extinct reptile in the Permian deposits of the Ural with a humerus showing the characters of the Theriodont Reptiles of the Karoo series of South Africa. The British Museum possesses a cast of the first-mentioned fragment, labelled by Krantz “*Eurosaurus uralensis*, H. von Meyer, *Brithopus priscus*, Kutorga.” The genus *Eurosaurus* was founded in 1842, by Fischer von Waldheim, upon some fragments of bone, including a humerus with a broad proximal end as in Kutorga’s *Orthopus*; and Fischer also noticed a humerus showing characters like those of Kutorga’s *Brithopus*, from the same locality as the portion of a jaw described under the name of *Rhopalodon Wangenheimii*, Fischer, which contained nine molar teeth, with thick, pointed, subcompressed crowns, with trenchant and serrate borders. In 1858 H. von Meyer described a skull from the Permian of the Ural, under the name of *Mecosaurus uraliensis*, as a Labyrinthodont; and Eichwald referred this genus, with Kutorga’s *Brithopus* and *Orthopus*, to Fischer’s *Eurosaurus*. The author regarded *Mecosaurus* as truly Labyrinthodont; whilst the Permian forms constituting Kutorga’s genus were referred to the Theriodont order. From the same locality as the above, Kutorga describes *Syodon biarmicum* as probably a Pachyderm. Its teeth resemble those of *Cynodraco*. Eichwald’s *Deuterosaurus biarmicum* is founded upon the fore part of both upper and lower jaws of a Reptile, containing teeth with denticulate or crenulate trenchant borders, the canines being large, especially in the upper jaw. *Deuterosaurus* closely resembles *Cynodraco*, and still more the *Lycosaurus* of the Karoo beds of the Sneewberg range. All the above are from the Permian beds of the Ural; and the author regards them as furnishing suggestive evidence of the Palæozoic age of the Karoo series, in which the Theriodont Reptiles are best represented.

The author further noticed a Theriodont allied to *Lycosaurus*, from a red sandstone, probably of Permian age, in Prince-Edward Island. The remains include the left maxillary, premaxillary, and

nasal bones; the teeth, implanted in distinct sockets, have sub-compressed, recurved, conical, pointed crowns, with minutely crenulated borders. The foremost tooth in the maxillary is a canine; and in other points the dentition shows Theriodont characters. This fossil has been described by Dr. Leidy under the name of *Bathynathus borealis*. Thus, supposing the affinities of the fossils from the Oural and Prince-Edward Island to be correctly determined, the Reptilia distinguished by Mammalian characters are shown to have had a very wide range. Further, the author thinks that the Theriodont Reptiles of the Bristol Dolomitic Conglomerate may also prove to constitute a family in the Theriodont order.

MISCELLANEOUS.

Parkeria inferred to have been a Species of Hydractinia.

By H. J. CARTER, F.R.S. &c.

To the Editors of the *Annals and Magazine of Natural History*.

GENTLEMEN,—Having lately received, again through the kindness of my friend Mr. W. J. Sollas, several specimens of *Parkeria* from the Cambridge Greensand, my attention has been directed to their structure, which so closely resembles that of the Hydractiniidæ that a parity of organization between the two may be fairly inferred, the particulars of which I hope to communicate to you on a future occasion.

I am, Gentlemen,

Yours faithfully,

HENRY J. CARTER.

London,
July 20, 1876.

On *Saccharomyces cerevisiæ*. By MM. FRANCISCO QUIROGA Y RODRIGUEZ and ENRIQUE SERRANO Y FASTIGATI.

The resumption of our experimental researches upon the influence exerted by various agents and the combination of different conditions upon the various inferior organisms has led us to the study of these influences upon beer-yeast. Our observations were made with the same Verick microscope which we used in our investigations of blood, and giving an amplification of 780 diameters. The number of observations and measurements has been 465, made upon 126 different preparations.

The results obtained are as follows:—

1. In all the preparations made, at the end of five or six days, with the *Saccharomyces* placed in distilled water and exposed freely to the air, light, and surrounding temperature, or in solutions of various phosphates and chloride of ammonium, or placed under the same conditions as the preceding after desiccation, we have observed an infinite number of more or less spherical yellowish corpuscles, in no case exceeding in diameter the thousandth of a millimetre,